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ABSTRACT

This report is an assessment of the energy needs and concerns of the United States cultural community: performing and visual arts groups, museums, historic properties, archives, libraries, community arts centers, zoos, aquariums, scientific collections, auditoriums, and individual artists and craftsmen. The findings and recommendations represent a distillation of the experience, ideas, and concerns of 25 cultural service organizations, 18 government agencies, and 27 cultural institutions, all of which are listed in the appendix. It was found that there are six energy-related issues that are relevant to all types of cultural institutions and groups in all parts of the country: (1) rising energy costs, (2) threats posed by energy shortages, (3) energy legislation and regulations, (4) energy-related information and technical assistance, (5) alternate energy sources, and (6) energy-efficient architecture and design. Recommendations are made regarding steps that government agencies, cultural service organizations, cultural institutions, and individuals might take to help resolve these issues. (Author/MLF)

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ENERGY and the CULTURAL COMMUNITY

A Report to the
National Endowment
for the Arts

by

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

SUMMARY

This report is an assessment of the energy needs and concerns of the U.S. cultural community: performing and visual arts groups, museums, historic properties, archives, libraries, community arts centers, zoos, aquariums, scientific collections, auditoriums and individual artists and craftsmen.

It was found that there are six energy-related issues that are relevant to all types of cultural institutions and groups in all parts of the country:

- rising energy costs
- threats posed by energy shortages
- energy legislation and regulations
- energy-related information and technical assistance
- alternate energy sources
- energy-efficient architecture and design

Recommendations are made regarding steps that government agencies, cultural service organizations, cultural institutions and individuals might take to help resolve these issues.

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ACKNOWLEDGMENTS

The study on which this report is based was initiated by the American Association of Museums and the American Arts Alliance. The Arts Energy/Study, as the project is called, was supported by matching grants from the National Endowment for the Arts (Office of Special Projects) and Exxon Corporation.

The report's findings and recommendations represent a distillation of the experience, ideas and concerns of 25 cultural service organizations, 18 government agencies and 27 cultural institutions, all of which are listed in Appendix A, p. A-1. More than 100 individuals generously offered advice, assistance and encouragement.

Some of the project research was carried out under a sub-contract to Educational Facilities Laboratories, Inc., part of whose overhead cost was contributed. Administrative services were provided by the American Association of Museums. Office space and support services were provided by the American Museum of Natural History and the Cultural Services Group, Inc.

The opinions and recommendations offered in the report are those of the author, and do not necessarily reflect the views of the funding agencies or the cooperating organizations, agencies or institutions.

1. BACKGROUND

This report is an assessment of the energy needs and concerns of all sectors of the U.S. cultural community: performing and visual arts, museums, historic properties, archives, libraries, community arts centers, zoos, aquariums, scientific collections, auditoriums and individual artists and craftsmen.

The year-long study on which the report is based was completed in early 1979. However, the report's antecedents can be traced back to 1973-74, when an oil embargo led to long lines at gas stations, reduced tourism, trucking strikes, electrical power shortages, curtailed airline schedules and layoffs in many industries.

Largely unnoticed by the mass media, the cultural community suffered many of the problems encountered in other sectors of the economy. Millions of dollars in attendance fees and related income were lost. Personnel were laid off. Many touring performances and traveling exhibits were delayed or cancelled.

Supported by the National Endowment for the Arts, a "Clearinghouse on Museums and the Energy Crisis" surveyed museums' energy needs and offered problem-solving suggestions through newsletters. Data supplied by the Clearinghouse helped the Endowment persuade the Federal Energy Office to allow sufficient gasoline for school bus trips to and from cultural institutions.

When the oil embargo ended, problems of energy scarcity diminished. However, prices for fuels, utilities and petroleum-based materials continued their rapid climb, placing yet another burden on the chronically strained budgets of of cultural institutions and organizations.

The severe winter of 1976-77, coupled with a shortage of natural gas, forced cancellation of performances and closing of museums and other cultural institutions in Ohio, Delaware, upstate New York and other parts of the country. Once again the cultural community responded to the crisis. The Energy Clearinghouse was revived in late 1976 and broadened to serve all types of cultural institutions. An "energy hot line" was added in 1977.

At the policy level, the National Council on the Arts, the American Association of Museums, the National Conservation Advisory Council, the Association of Art Museum Directors, the American Association for State and Local History and other organizations passed or endorsed resolutions urging the cultural community to conserve energy, and asking federal, state and local agencies to take the needs of the cultural community into account in setting energy policies and priorities. (Several of these statements will be found in Appendix B, p. A-3.)

In mid-1977 the National Endowment for the Arts and Exxon Corporation granted the American Association of Museums funds for a series of energy workshops at state and regional museum conferences. These workshops focused on ways to conserve energy and to protect collections and buildings during energy shortages. The material on the latter topic proved particularly timely, for during the 1978 coal strike it provided the basis for a booklet, "Protection of Cultural Properties During Energy Emergencies," that was sent to thousands

of cultural institutions in the states hardest hit by the coal shortage.

It became increasingly clear that different sectors of the cultural community shared many energy needs and concerns in common, so in late 1977 the American Association of Museums and the American Arts Alliance joined with other cultural service organizations in initiating a study of these issues.

In early 1978 a series of meetings, conferences, workshops and interviews began, the results of which are described in subsequent portions of this report.

The remaining text of the report is divided into three sections: Findings, Recommendations and Afterword. The appendices expand on many of the points raised in the text. A description of the services and materials provided by the Energy Information Clearinghouse will be found in Appendix H, p. A-17.

2. FINDINGS

A series of three statements is sufficient to outline the predicament in which cultural institutions and organizations find themselves:

- The cultural community has special energy needs and concerns.

- These energy needs and concerns are generally unknown to the government agencies, legislative and regulatory bodies, and officials who control energy allocations and energy-related funds and technical assistance programs.

- The cultural community wants to conserve energy and to deal effectively with its other energy problems, but does not have access to the funds and technical assistance programs that have been made available to fast food restaurants, factories, schools, office buildings, hospitals and almost every other type of facility.

A further analysis of this complex situation reveals that, while each sector of the cultural community might have one or two unique or unusual energy problems, there are six energy-related issues that are relevant to all types of cultural institutions and groups in all parts of the country:

- rising energy costs
- threats posed by energy shortages
- energy legislation and regulations
- energy-related information and technical assistance
- alternate energy sources
- energy-efficient architecture and design

The six general issues are described below, while some of the institution- or group-specific problems are discussed in Appendix C, p. A-8.

A. Rising Energy Costs

While government agencies and energy suppliers to not always agree about the details of energy supply and demand, there is general agreement that energy costs will continue to rise for the foreseeable future. Coming on top of staggering energy cost increases since the start of the 1973-74 oil embargo, an enormous--and increasing--burden is being placed on the operating budgets of cultural institutions and groups.

Cultural facilities tend to be energy-intensive. They often require climate control systems to preserve their contents, maintain acceptable visitor comfort levels and provide suitable levels of lighting for performances, exhibits and other public programs. The not-for-profit institutions are generally unable to pass increased energy costs along to consumers, so programs, activities and hours of operation have often had to be reduced. These curtailments in turn have had negative impacts on the economy and the quality of life in the cities and regions in which the institutions are located.

The most effective way to control energy costs is through implementation of

systematic energy conservation programs. The details of such programs have been developed, tested and refined over the past several years, and can be applied with some modification to most cultural facilities.

Many of the steps required to conserve energy can be taken at little or cost, and can result in savings of 20% or more in annual fuel and utility bills. One example of this type of saving is provided by the Lincoln Center for the Performing Arts, which in 1977 saved $700,000 or 19% of its utility costs by implementing a series of low- and no-cost energy management procedures. (See description in Appendix D, p. A-10.) Similar savings have been achieved other cultural institutions of different types and sizes.

Savings of this type are doubly important. First, they represent one area where costs can be controlled without compromising the quantity or quality of the institution's program. Second, energy conservation is something like an endowment, in that it provides benefits--savings in energy costs--year after year. In the case of Lincoln Center, a recurrent energy savings of $700,000 per year is like having an endowment of $10 million earning 7% interest.

The interest of the cultural community in energy conservation programs has grown substantially since early 1978; unfortunately, due to lack of technical assistance programs and funds, only a small percentage of cultural facilities has been able to carry out an energy conservation plan as systematic--and rewarding--as that of Lincoln Center.

Also, in the absence of incentives such as technical assistance programs and funds for energy conservation, there may even exist situations or conditions that discourage energy conservation efforts. (For details, see Appendix E, p. A-12.)

B. Threats Posed by Energy Shortages

1. Fuel and Utilities

Many types of cultural facilities must maintain limited ranges of temperature and relative humidity in order to preserve art works, antiques, archival materials, musical instruments, living specimens and even, in the case of historic buildings, the structures themselves. The requirements for climate control are summarized in the energy statement of the National Conservation Advisory Council, which will be found in Appendix B, p. A-6.

Because these climatic needs are not widely known to utility commissions, legislators and government officials, cultural facilities are usually classified as commercial buildings, and are therefore among the first to have their energy sources curtailed during shortages or emergencies.

Thus, shortages of fuel and utilities pose severe threats to the contents and structures of cultural facilities. In addition, energy shortages often force the closing of cultural institutions, which in turn leads to layoffs, cancellation of programs and loss of income.

2. Gasoline

As shown during the oil embargo of 1973-74 and again during the spring of

1979, gasoline shortages and price hikes curtail auto travel by tourists and bus trips by school groups, leading to a decline in admissions income and related revenues at many cultural facilities, particularly those away from metropolitan centers.

Gasoline shortages also pose great hardships for touring groups and traveling or mobile exhibits.

C. Energy Legislation and Regulations

Virtually every piece of federal, state and local legislation has ignored the energy needs and concerns of the cultural community. This omission is due to three main factors:

- lack of awareness on the part of legislators and regulators
- lack of lobbying effort by cultural service organizations and institutions
- lack of firm statistics on the number, size and types of cultural facilities and the amount and types of energy consumed

(1) Federal Level

Perhaps the most significant example of failure to address cultural institutions' energy needs is the National Energy Act of 1978, which is comprised of five bills. The bill of greatest interest to cultural institutions is the National Energy Conservation Act of 1978 (Public Law 95-619). Title III of the Act has two parts that may apply to some cultural facilities:

- Part 1 authorizes $300 million per year for three years, to be used as matching grants for energy conservation programs in schools, colleges, universities, hospitals and, it appears, libraries. Aside from the possible inclusion of libraries, it seems that the only other cultural facilities eligible for assistance under Part 1 will be those that are part of a college or university (e.g., university museum, gallery, theater, etc.).

- Part 2 authorizes $65 million for two years, to be used as matching grants for energy audits in buildings owned by units of local government (counties, municipalities, townships). Thus, only those cultural facilities owned by units of local government will be eligible.

It is estimated that, aside from libraries, only a small percentage of cultural facilities, perhaps 20%, will be eligible for any of the funds and services provided by the National Energy Conservation Act of 1978.

Other federal-level activities include the setting of standards of energy use in buildings. For example, both the Department of Energy and the Department of Housing and Urban Development are involved in setting energy performance standards for new buildings. Unfortunately, there has been little input from the cultural community in this process. While the standards will not have the force of law, they will serve as the models on which state and local codes are based.

(2) State Level

All states have established an energy office. However, the efforts of these

offices are directed primarily toward residences, businesses, factories, educational institutions and hospitals. Only in Massachusetts, Connecticut, New York and one or two other states have energy offices taken an active role in addressing the energy problems of cultural facilities. Based on experience to date, the most likely state agency to assist in carrying out energy-related programs for cultural institutions is the state arts council.

Most energy codes are developed and enforced by states. And while the state codes tend to be based on model standards developed by federal agencies or other groups, no two state energy codes are exactly alike. Thus, the code-related problems of cultural institutions in one state may vary from those in a neighboring state.

While most state energy codes fail to take into account the needs of cultural facilities, museums in Massachusetts, with the assistance of the Massachusetts Energy Policy Office, succeeded in obtaining an exemption from code-specified standards of temperature and relative humidity. (See details in Appendix F, p. A-14.)

(3) Local Level

A few cities--Boston, New York, Seattle--have extended some energy-related assistance to cultural facilities, particularly those owned by the local government authority. Because the city often pays the institutions' utility costs, there is a direct incentive for the city to help the institutions conserve energy and make any renovations or new buildings more energy-efficient.

D. Energy-Related Information and Technical Assistance

Since the oil embargo of 1973-74 the cultural community has shown a growing appetite for information on energy conservation, ways to cope with fuel shortages, protection of collections and buildings during energy emergencies, legislation, regulations and other such topics.

Because of limited access to government funding and technical assistance for energy-related activities, there has been considerable reliance on printed materials and self-help projects. For example, in calendar year 1978 the Energy Information Clearinghouse distributed some 11,000 copies of booklets, bulletins and fact sheets on a wide range of energy topics.

Since 1976 communications links have been established with most of the major service organizations in the cultural community, so it is a relatively easy matter to disseminate energy-related information to cultural institutions in every state. However, there is still a need to develop more links with federal and state agencies that could provide additional information, materials and assistance.

Because the funding and technical assistance programs derived from federal energy legislation will be implemented at the state level, it is perhaps most important to help cultural institutions and organizations establish communication and cooperative working relationships with their state energy offices.

E. Alternate Energy Sources

The cultural community has shown great interest in alternate energy sources, and there are many such projects in operation or pending:

- Museum of Albuquerque: new building with active and passive solar systems for heating and hot water

- Hagley Museum, Wilmington, Delaware: generation of electricity by water-driven turbine

- Hall of Science of the City of New York: use of alternate energy sources--solar, methane, etc.--as an integral part of exhibit and education programs

- Public Library, Naples, Florida: solar space heating

- Savannah Science Museum, Georgia: solar heating, cooling and hot water

- Chicago Museum of Science and Industry: solar heating demonstration project

- Big Horn Canyon Recreational Area Visitors Center, Lovell, Wyoming: solar heating and hot water

- Land Between the Lakes, Tennessee Valley Authority, Golden Pond, Kentucky: solar space heating for planetarium and exhibit center

- Oregon Museum of Science and Industry, Portland: solar demonstration house

- Smithsonian Institution: wood chip furnaces

It will be noted that these projects do not include any performing arts institutions; however, there have been some recent inquiries about the feasibility of incorporating alternate energy sources in such facilities.

Most of the projects mentioned above have been supported fully or in part by government funds; and, given long payback periods and untested technologies, further experimentation by cultural institutions is not likely to take place without continued subsidy.

It should be mentioned that such demonstrations serve not only to benefit the institutions in which they are carried out, but to educate the large audiences that visit these institutions.

F. Energy-Efficient Architecture and Design

It is only in the past few years that architects and their clients have begun to place a high priority on designing energy-efficiency into buildings. And, given the large number of cultural facilities that undertake new construction and renovation each year, there is an excellent opportunity to effect substantial energy savings through active and passive design elements.

3. RECOMMENDATIONS

Given the magnitude and complexity of the energy needs and concerns of the cultural community, it would be presumptuous to think that a single report could resolve these matters once and for all. However, it is hoped that this report will add impetus to the problem-solving and program development in which so many agencies, organizations, institutions and individuals are now involved.

The recommendations below suggest areas in which new or continued activity might be concentrated.

A. The Role of Government Agencies

(1) National Endowment for the Arts

Since the oil embargo of 1973-74 the National Endowment for the Arts has taken a lead role in efforts to ameliorate the energy problems of cultural institutions and groups. The Endowment should continue and, to the extent feasible, expand its role in this area.

Specific steps might include expansion of joint programs with the U.S. Department of Energy and other federal agencies, and inclusion of energy-related funding categories in program guidelines.

(2) Federal Council on the Arts and Humanities

Given its mandate to promote coordination among federal programs that deal with cultural programs and facilities, the Federal Council on the Arts and Humanities is in a unique position to encourage and facilitate communication and cooperation among the many agencies and offices that are--or could become--parties at interest.

Such cooperation would allow greater information sharing, avoid duplication of effort, and give a clearer picture of the energy-related services, assistance and support that can be provided to various sectors of the cultural community by different federal agencies.

(3) State Arts and Humanities Councils

As a result of their charge to promote cultural programs and to preserve the cultural heritage, state arts and humanities councils are in a position to help communicate to state energy offices and legislatures, governors' offices and utility commissions the unique and pressing energy needs and concerns of cultural institutions and groups.

B. Rising Energy Costs

The most important step a cultural institution can take to deal with rising energy costs is to implement an energy conservation and management program. Until more technical assistance and support are made available by government

agencies and other sources, it will be necessary to rely largely on self-help efforts.

One local source of assistance might be found in corporations, many of which have carried out successful energy conservation programs in their own facilities. In some cases utility companies are able to provide advice or assistance in energy conservation efforts. (It should be kept in mind that some energy conservation steps applied in commercial or residential buildings may not take into account the special lighting and climate control needs of many cultural facilities.)

It is likely that an energy management manual for museums and related cultural facilities will be available by fall of 1979; however, there will still be a need for training and technical assistance programs to help institutions use the manual to maximum benefit.

C. Energy Legislation and Regulations

Most of the energy problems faced by cultural institutions and groups are related to the failure of legislation and regulations to take into account the special needs and concerns of the cultural community.

This is largely a political matter in which it is up to the cultural institutions and their service organizations to make the case to legislative and regulatory bodies that the special energy needs of cultural groups merit special consideration.

Trustees of the institutions and service organizations can be an important source of assistance in making this case.

D. Information and Technical Assistance

The Energy Information Clearinghouse, which is operated in cooperation with the major cultural service organizations, is able to to disseminate energy-related information to and through national and state cultural service organizations, federal agencies, state arts and humanities councils and professional societies.

However, there is a presently unmet need to establish lines of communication and cooperation between cultural groups and local sources of support and information: state energy offices, energy research centers, regional offices of federal agencies. Establishing such links will probably require the efforts of state arts and humanities councils, national and state service organizations and various federal agencies.

E. Energy-Efficient Facilities Design and Alternate Energy Sources

If energy-efficient design is to be applied to cultural facilities there must be an increased dialogue among government agencies, professional societies of architects and engineers, and administrators of cultural facilities. Research is also required to establish appropriate criteria for energy-efficiency and for use of alternate energy sources.

F. Research

Millions of federal and state dollars have been spent on detailed assessments of the energy use and needs of various types of facilities: fast food chains, hospitals, schools, factories, offices, residences. Unfortunately, only a minute fraction of that amount has been spent to study the energy needs of cultural facilities.

Policy-makers and the cultural community would benefit greatly from studies of such topics as:

- levels of energy use in different types and sizes of cultural facilities
- low-cost climate-control methods for museums, historic houses and archives
- levels of temperature and humidity required by museum and archival collections, musical instruments, historic structures, scientific collections, etc.
- high-efficiency lighting for exhibits and stage sets
- design criteria for energy-efficiency in cultural facilities
- feasibility of using alternate energy sources in different types of cultural facilities
- effects of temperature and humidity changes on performing artists
- lightweight construction materials for touring groups and programs
- alternate energy sources and energy conservation methods for high-level consumers such as potters and glassblowers
- computer scheduling of touring groups and traveling exhibits to cut fuel and travel expenses

Research in these numerous and varied areas will obviously require the cooperation and collaboration of many agencies, institutions, service organizations and professional societies.

4. AFTERWORD

It is gratifying to see that this study has already begun to have positive effects.

The process of discussing and defining critical issues has focused the attention of agencies, organizations and institutions on this important topic. Inquiries about government agencies' energy programs and services seem to have encouraged more agencies to consider offering such assistance to the cultural community. Increasing numbers of service organizations are assessing the effects of energy legislation and regulations on their constituents. And more cultural institutions are seeking to make their facilities more energy-efficient.

To be sure, considerable effort and ingenuity will be required to solve the cultural community's energy problems. However, the cooperation and concern shown by so many agencies, organizations, institutions and individuals leave no doubt that the necessary efforts will be made.

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APPENDIX A: COOPERATING ORGANIZATIONS, AGENCIES AND INSTITUTIONS

This report is based on information, advice and guidance provided by the organizations, agencies and institutions listed below.

Service Organizations

American Arts Alliance
American Association for State and Local History
American Association of Museums
American Association of Zoological Parks and Aquariums
American Council for the Arts
American Institute of Architects
American Library Association
American Symphony Orchestra League
Association of American Dance Companies
Association of Art Museum Directors
Association of Science-Technology Centers
Association of Systematic Collections
International Association of Auditorium Managers
National Assembly of Community Arts Agencies
National Assembly of State Arts Agencies
National Association of College and University Business Officers
National Conservation Advisory Council
National Trust for Historic Preservation
New York State Council on the Arts
Ohio Museums Association
OPERA America
Regional Conference of Historical Agencies
Society of American Archivists
Theatre Communications Group
Western Association of Art Museums

Government Agencies

Advisory Council for Historic Preservation
Federal Council on the Arts and Humanities
General Services Administration
Heritage Conservation and Recreation Service
Institute of Museum Services
National Endowment for the Arts
National Endowment for the Humanities
National Historical Publications and Records Commission
National Park Service
New York City Department of Cultural Affairs
Office of the Governor of the State of Washington
Ohio Arts Council
Ohio Department of Energy
Tennessee Valley Authority
U.S. Department of Commerce
U.S. Department of Energy (Washington, D.C.)

Government Agencies (cont'd.)

U.S. Department of Energy (Region 2)
U.S. Department of Housing and Urban Development

Institutions

American Museum of Atomic Energy
American Museum of Natural History
Boston Museum of Fine Arts
Brooklyn Museum
Chicago Museum of Science and Industry
Circle in the Square Theater
Cleveland Museum of Art
Columbus Gallery of Fine Arts
Dayton Art Institute
Dayton Museum of Natural History
Fogg Art Museum
George Street Playhouse
Hagley Museum
Heckscher Museum
Hunterdon Arts Center
Lincoln Center for the Performing Arts
Long Wharf Theater
Metropolitan Museum of Art
Museum of Albuquerque
National Gallery of Art
Ohio Historical Center
Oregon Museum of Science and Industry
Pacific Science Center
Playwright's Horizon Theater
Savannah Science Museum
Smithsonian Institution
Winterthur Museum

Others

Cultural Services Group, Inc.
Educational Facilities Laboratories, Inc.
Office of Fritz R.S. Dressler, Energy Management Consultant
Office of Richard G. Stein, Architect
Syracuse University Institute for Energy Research
Syska and Hennessy, Inc.

(Note: Every effort has been made to ensure that this list is complete. If there are any omissions they are inadvertent and the author offers his apologies.)

APPENDIX B: ENERGY POLICY STATEMENTS

National Council on the Arts.....A-4

American Association of Museums.....A-5

National Conservation Advisory Council.....A-6

NATIONAL ENERGY GOALS AND THE ARTS

(Adopted by the National Council on the Arts 14 May 1977)

The National Council on the Arts is confident that the nation's artists and cultural institutions will respond enthusiastically to the President's call for national energy measures which will develop new and existing energy resources and also conserve them. The Council believes that through efforts already made the nation's cultural institutions and artists will make a significant contribution to national goals.

The Council urges the National Endowment for the Arts to assist in disseminating information on legislative and administrative action that affects its constituencies and on ways to conserve energy.

The Council notes with pride that the Architecture, Planning and Design Program of the Endowment has made special efforts to meet the President's goals. It urges that even greater consideration be given to examining ways the Endowment and other federal agencies can assist individuals and groups to conserve energy. Some measures could include renovation of facilities, installation of climate control systems, and development of lighter, more easily transportable equipment for touring groups.

While artists and cultural institutions will make every effort to assist in meeting national energy goals the Council feels it is important to emphasize that adequate energy resources should be available to artists and cultural institutions so they can contribute to the quality of life in the United States. It is, for example, essential that our craftsmen have the fuel to fire their kilns, that transportation be available for performing arts activities, and that our nation's museums have the energy required to preserve the objects that comprise the cultural heritage of our people.

ENERGY RESOLUTION OF THE AMERICAN ASSOCIATION OF MUSEUMS

(Adopted by the AAM Council 29 May 1977)

Whereas, institutions and their governing authorities charged with the preservation of cultural properties (museums, archives, historical societies) do not control the distribution of fuel supplies necessary to maintaining the environmental standards and conditions required to assure collections preservation, and

Whereas, these institutions must routinely make all possible effort to maintain temperature and humidity standards; and further, in times of emergency or long-term curtailment and other public needs, they must take extraordinary measures, where possible, to reduce consumption while protecting their collections, and

Whereas, these institutions and/or their professional representatives recognize their responsibility to inform local, state and federal regulatory and legislative bodies of the essential fuel considerations required to preserve our cultural heritage,

Therefore, be it resolved that local, state and federal officials, both public and private, who determine energy policy and fuel allocations and who establish special considerations for energy consumers, recognize that curtailment of critical fuel sources or reduction of existent fuel supplies directly affect the environmental conditions necessary for the preservation of our national heritage and they share the responsibility for preserving these irreplaceable collections for posterity.

National Conservation Advisory Council

AN ADVISORY BODY ORGANIZED TO CONSIDER NATIONAL NEEDS IN THE CONSERVATION OF HISTORIC AND ARTISTIC WORKS IN THE UNITED STATES

STATEMENT ON THE CONTROL OF ENVIRONMENTAL CONDITIONS FOR PRESERVATION OF CULTURAL PROPERTY IN SITUATIONS OF ENERGY SHORTAGE

INTRODUCTION

The National Conservation Advisory Council (NCAC) was established in 1973 to study the needs for preserving the Nation's buildings, fine and decorative art collections, archeological materials, books, documents, photographs, and other cultural property. The following statement has been prepared to alert responsible officials to the special requirements of environmental control in institutions charged with the preservation of cultural patrimony. An increased understanding of these concerns, particularly by persons responsible for the allocation of energy resources, hopefully will advance our common goal and mutual responsibility: the preservation of the Nation's artistic and historic collections for posterity.

In cooperation with the energy committees of the American Association of Museums, the Association of Art Museum Directors and Energy Coordinator of the National Endowment for the Arts, NCAC will continue its efforts to explore ways in which the conditions required for maximum safety of the materials of America's cultural history can be maintained with a minimum expenditure of energy.

STATEMENT

The first, and ultimately the major, responsibility of museums, libraries, archives, and historic buildings is the preservation of the cultural and historical materials entrusted to their care. To minimize the damage or complete loss of rare and irreplaceable items, these institutions must control the environmental conditions within their buildings – temperature, humidity, and atmospheric pollutants. Careful consideration of the need to control the environment is part of the trustees' and administrators' responsibilities in order to fulfill their explicit obligation to preserve the Nation's cultural patrimony.

The relationship between environment and deterioration has long been recognized and documented by museum and archival authorities. Uncontrolled changes in humidity and temperature have been identified as two of the main causes of the destruction of cultural property. Large or rapid fluctuations in temperature or relative humidity can result in cracking, splitting, and warping of a wide variety of materials. Levels of relative humidity much over 65 percent, if extended for a day or more, can result in the growth of mold. Thus, the maintenance of both humidity and temperature within prescribed limits is essential to avoid serious and irreversible damage.

The maintenance of proper temperature and humidity involves the use of humidifiers and dehumidifiers, heating and cooling systems. Atmospheric pollutants, both chemical and particulate, present additional hazards to preservation; to eliminate these, scrubbers and filters are used. All these protective systems require energy for operation.

The maintenance of stable environmental conditions is of such importance that most newly constructed museum and archival buildings include environmental control systems that must operate continuously. Because of costs and problems of installation, many historic houses and older buildings still have only partial systems. Nevertheless, change in the temperature and humidity in any of these institutions results in damage to their buildings and collections.

A matter of particular concern is the possibility of interruption of energy services with little or no advance notice. Such an event carries with it the danger that the sudden changes in environmental conditions will result in extensive damage to collections and buildings. The effects of temperature and humidity changes on cultural property described herein apply equally to the contents of museums and to the buildings within which they are exhibited; for example, in historic structures built without modern vapor barriers, temperature or humidity changes may cause the dew point to be reached within walls with resulting condensation and wood rot.

Taking into account the above factors, the NCAC endorses the following guidelines in situations of energy shortage:

1. *Institutions responsible for the preservation of cultural patrimony must be given special consideration when energy priorities are established.*

2. *The primary need is to maintain humidity and temperature as steady as possible – sudden changes can be disastrous. When major changes in temperature and humidity unavoidably occur, special efforts must be made to control the rate of change so that it will only take place gradually over a period of at least one week. To a degree, damage can be reduced if advance notification can be made; this is the very minimum precaution that must be taken in emergency situations.*

3. *Widely recognized environmental standards for the year-round conditions needed to avoid damage to collections in modern museums and archives are 50 percent relative humidity (±5 percent) and temperature of 65° F. (±5°).*

   Should it become absolutely impossible to maintain accepted environmental standards, every effort must be made to maintain relative humidity within a range of not less than 40 percent (winter) or more than 60 percent (summer). Temperatures should be kept within a range of not less than 55° F. (winter) or more than 80° F. (summer). Variations and fluctuations in environmental conditions beyond these limits will cause irreversible damage to collections.

4. *Certain classes of materials – for example, microfilm, motion picture film, and other photographic negative materials – require special levels of temperature and humidity other than those described above. The central staff responsible for the care of collections must convey any unusual requirements to persons concerned with the allocation and control of energy resources.*

5. *Because most institutions have collections of varied materials requiring different environmental standards, it is not appropriate to consolidate such collections in one area during situations of energy shortage.*

FURTHER INFORMATION

In these times of diminishing fuel and power resources, the Nation's cultural institutions will continue to explore various means to reduce their overall energy demands without endangering their collections. To assist these organizations with short- and long-range plans for conservation of energy, a number of manuals and resource books on the subject of energy management are available. The American Association of Museums (AAM) is preparing an advisory review of these manuals, with special reference to the needs of museums, for release early in 1978. It is strongly urged that such sources be consulted for further information.

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APPENDIX C: INSTITUTION- AND GROUP-SPECIFIC ENERGY PROBLEMS

While all types of cultural institutions and facilities share the general concerns and problems noted in the text, in the course of carrying out the research for this project it became clear that there are some energy problems that are particularly acute for different types of institutions or groups. Some of these issues are noted below.

1. Archives, museums, libraries, scientific collections and historic societies often require particular ranges of temperature and relative humidity to preserve their contents: manuscripts, art works, antiques, specimens, etc. When these climatic conditions are provided, they must be maintained 24 hours a day, 7 days a week.

2. Zoos, aquariums and botanical gardens require particular ranges of temperature and relative humidity to keep their collections alive and well. Proper climatic conditions are also very important to the propagation of many species of flora and fauna.

Seals, porpoises and other aquatic mammals are extremely popular, so many zoos and aquariums have added numbers of these animals. However, they require 4-5 times as much energy to keep as many other types of animals.

3. Book publishers are using cheaper grades of paper with higher acid content, which leads to reduced longevity of books and manuscripts. Maintaining the proper climate to preserve these books will require even greater amounts of energy in the years to come.

The problem of deteriorating library and archive collections is not of small magnitude. For example, it is estimated that 1/3 of the 18 million volumes in the Library of Congress are in advanced stages of deterioration.

4. Energy requirements in performing arts facilities pose many problems. Performers, audiences and instruments require acceptable levels of temperature and humidity. High levels of lighting must be used to achieve desired and necessary esthetic effects.

5. Many artists and craftsmen--potters, glassblowers, welders--require substantial amounts of energy. Little attention has been paid to helping these people find alternate or less expensive energy sources.

6. Energy conservation in historic buildings (or other cultural facilities) is not a simple matter.

External or internal storm windows and doors may compromise or destroy the historic accuracy and esthetic aspects of the building.

Many salesmen are pushing the use of urea-formaldehyde foams or cellulose to insulate walls and attics. Improper mixing of foam components may result in improper curing, inadequate insulating properties or the presence of a formaldehyde odor. As foam cures, moisture is given off and may be absorbed by the surrounding structural materials, with resultant deterioration of the structure. Some foams give off a toxic gas when burned. Some cellulose mixtures contain aluminum or ammonium sulfate as a fire retardant, which may form sulfuric acid when moisture is present.

Another problem of insulating historic buildings is failure to use or properly place a vapor barrier. This leads to condensation of moisture in the insulation materials, with resultant reduction in insulating properties. This condensation in wall cavities and other spaces may also cause deterioration of building materials and peeling of paint.

Any energy conservation plan for an historic building or older cultural facility should take these potential difficulties into account.

APPENDIX D: LINCOLN CENTER ENERGY MANAGEMENT PROGRAM*

Lincoln Center for the Performing Arts is a large complex comprised of six buildings: the Metropolitan Opera House, the New York State Theatre, the Juilliard School/Alice Tully Hall, Avery Fisher Hall, the Vivian Beaumont Theater, and a library/museum. Additional facilities include a large plaza and a parking garage. In 1976 the total utility cost for the entire complex was about $3 million.

In January, 1977 two committees--one made up of trustees, the other of staff--were established to organize and carry out a comprehensive energy conservation program. A series of low- and no-cost steps were taken through administrative action, resulting in a savings of about $700,000 (19%) in 1977 utility costs. The steps taken are summarized below.

(Note: Stage and performance lighting was not changed for esthetic reasons.)

- Replacement of incandescent lighting with more efficient fluorescent lighting.
- Replacement of high wattage bulbs and lamps with lower wattage bulbs and lamps.
- Installation of switches for independent control of area lighting.
- Closing off every other light or three out of every four lights.
- Use of single elevators when houses are not in full operation.
- Reduction of lighting in elevators.
- Closing of down lights and public area spotlights when there is no performance and daylight suffices.
- Closing of light illuminating performance posters when buildings are empty.
- Installation of more ASCO switches and use of dimmers when appropriate.
- Placement of color tags on lamps and lights that are not to be replaced and those that are to be used only during performances.
- Replacement of lamps in certain areas only when one-third of them need replacement.
- Use of gang cleaning techniques where practical, so that only one floor at a time needs to be lighted.
- Removal of light globes in fire stairs and reduction of bulb wattages.
- Removal of one lamp and ballast in three-lamp, two-ballast fixtures.
- Use of "phantom" fluorescent tubes in two-tube fixtures.
- Use of only aisle lights in storerooms when not in use.
- Installation of key switches in high traffic areas to prevent random use of lights.
- Turning off ventilation (heating or air conditioning) half an hour before the end of performances.

(continued)

*Adapted from materials and information supplied by Andre Mirabelli, Corporate Secretary and Director of Business Affairs of Lincoln Center. From Robert A. Matthai, "Energy Conservation and Management: A Critical Challenge for Cultural Institutions." Technology and Conservation, Spring, 1978, p. 17.

- Elimination of heating and cooling in large lobbies and public places.
- Adjusting and reducing ventilation schedules in auditorium and backstage areas.
- Scheduling of energy conservation seminars for building employees with management and staff and representatives of Con Edison, the Federal Energy Administration and consulting engineers.
- Carrying out a monthly administrative review to see that all of the above steps are being carried out, to review consumption and savings statistics, to have building managers exchange energy savings information, and to see if more savings can be effected.

Other energy conservation programs requiring a capital investment of $750,000 are being planned, with payback periods ranging from one to five years.

APPENDIX E:

FACTORS THAT MAY INHIBIT ENERGY CONSERVATION IN CULTURAL FACILITIES

There are many internal and external factors that may inhibit energy conservation in cultural facilities. While a detailed analysis of these issues is beyond the scope of this report, the factors will be noted briefly below.

1. If there is a single reason that so few cultural facilities have carried out systematic energy conservation plans, it is because they have been offered virtually no funding support or technical assistance by federal, state and local agencies. This situation stands in glaring contrast to the support and assistance offered to other sectors of the economy.

2. Energy is not glamorous and interesting; cultural programs are. There is an understandable tendency for trustees, management and staff of cultural institutions to focus on the exciting aspects of the institution--programs--and to ignore mundane matters such as energy use.

3. As a percentage of overall budget, energy cost is a relatively small item for most cultural institutions. And, given the institutions' focus on programs, which consume the bulk of budgets, the energy cost--if it is even known--is rarely given much attention.

A way to emphasize the importance of energy cost is to analyze its proportion of operating expenses (not program expenses), and to underscore the point that energy cost is one of the very few operational expenses that can be reduced without compromising program quantity and quality.

4. Many directors of cultural institutions have risen through the program ranks, and may not have managerial training per se. Therefore, they may not be familiar with management techniques and procedures that can be applied to energy problems and conservation efforts.

5. Cultural institutions typically use large amounts of energy for lighting, climate control and similar purposes. In the absence of demonstrably effective alternate technologies to meet these needs, it is very hard for the administrators and program staff of cultural institutions to experiment with energy conservation steps that may appear to threaten or compromise the basic missions of the institutions.

6. Some cultural institutions and organizations operate in rented buildings. While energy bills may be paid by the renter, there is little incentive to make a capital investment in insulation or other energy conservation measures in a building that is owned by someone else.

7. Some cultural facilities are owned and administered by cities or other

units of government. In most such cases the city pays the fuel and utility costs; and in some instances the institution does not even see the bills. In the absence of data on how much energy is used, and how much it costs, the cultural institution has neither information nor incentive for an energy conservation program.

Some cities have addressed this problem by setting limits on how much the city will pay for energy, with the institution to be responsible for any "overruns." The perceived punitive nature of such ceilings may be softened if the city offers the cultural institution assistance in developing and implementing energy conservation programs.

There are other approaches to the problem. For example, a division of the "proceeds" of energy savings is likely to appeal to the institution, while simultaneously reducing the city's costs: half of any savings accrue to the city, and the balance to the institution for use in its programs and operation.

APPENDIX F: MUSEUMS AND THE MASSACHUSETTS ENERGY CODE*

The state energy code issued by Massachusetts in January 1978 clearly illustrates the need for the cultural community to participate in the formulation of state codes.

These regulations were essentially in two parts--the thermal section based on the NCBCS model and the lighting section developed by the state. Boston's Museum of Fine Arts, in the process of installing a new climate control system, was subject to the thermal section because the code applied to both new construction and any significant renovation. The main conflict developed over temperature and humidity control.

The code specified that "new energy" (all energy that has not been recovered from some energy utilization) could not exceed the following parameters:
winter - max. 72°F and max. 30% relative humidity
summer - min. 78°F and max. 60% relative humidity
However, in a statement issued in December 1977 the National Conservation Advisory Council recommended the following year-round climatic conditions to protect works of art: 65°F (± 5°) and 50% (± 5%) relative humidity.

With cooperation from the Massachusetts Energy Policy Office, the museum applied for an exemption not only for itself but for all such facilities in Massachusetts. In April (1978) the State Building Code Commission in hearing this application decided that museums were a "special application" under section 2204.3 of the code which allowed exemptions for certain types of buildings such as hospitals, laboratories and "rooms containing thermally sensitive equipment...."

The lighting section, however, proved to be somewhat different. Unlike the thermal section, this one applied to both new construction and existing buildings. Also, unlike the model code, it established specific maximum watts per square foot (w/sf). Of particular interest was the 3 w/sf allowed for public places (for example, exhibit spaces). The museum found that to light exhibits properly it often had to exceed this limit. At this time Ross Farrar, director of museum operations, feels that, since the code allows for many tradeoffs, it is far too early to tell how much "trouble" the museum is in. Another point that may help is the allowed exemption from the w/sf calculations for task lighting and for "theater, television, spectator sports and like performances." As a result, while the issue is still very uncertain its does appear resolvable.

*Reprinted from Al Zgolinski, "Cracking the Codes." Museum News, January/February, 1979, pp. 53-54.

APPENDIX G: BIBLIOGRAPHY

There have been relatively few publications that relate directly and specifically to the energy needs and concerns of cultural facilities. And while the list below may not be exhaustive, it is probably very nearly so.

The bibliography is constructed in chronological order, from past to present, allowing the reader to get a sense of how cultural institutions' energy concerns have shifted and developed over time.

Items marked with an asterisk (*) are available free from the Energy Information Clearinghouse, Box 1032, Flushing, NY 11352.

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Trucco, Terry. "Quick Fix, Refit and Systems Convert." ARTnews, March, 1979, pp. 131-132.

Zgolinski, Al. "Cracking the Codes." Museum News, January/February, 1979, pp. 52-55 and 73-74.

APPENDIX H: ENERGY INFORMATION CLEARINGHOUSE

1. Clearinghouse

During the 1973-74 oil embargo the Energy Information Clearinghouse was established to deal with the energy problems of museums; and in 1976 its scope was expanded to include all types of cultural institutions and facilities.

The Clearinghouse provides a variety of publications and, with the assistance of a panel of architects, engineers, building managers and other specialists, responds to questions about energy-related matters involving cultural facilities.

The Clearinghouse is now operated by the New York Hall of Science in cooperation with the American Association of Museums, the American Arts Alliance and other cultural service organizations, under the direction of Dr. Robert A. Matthai.

Written inquiries should be directed to:

Energy Information Clearinghouse, Box 1032, Flushing, NY 11352.

2. Energy Hot Line

In December, 1977 the Clearinghouse established a "hot line" to handle pressing questions. Inquiries are recorded 24 hours a day, and responded to as quickly as possible. Technical matters are referred to a panel of specialists. The number to call is in New York: (212) 699-9152. While there is no charge for the information service, it should be noted that the call is not toll-free.

3. Free Printed Materials

While supplies last, single copies of the articles and pamphlets listed below are available from the Energy Information Clearinghouse, Box 1032, Flushing, New York 11352. Multiple copies of some items are available to service organizations for distribution to their members; write for details.

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